

CLAIMS

We claim:

1. A solution for removing a sulphur compound or carbon dioxide from a fluid, said solution comprising:
 - (a) sulphuric acid, at between about 0.1 to 10 percent by volume of the solution;
 - (b) a metal, at between about 0.05 to 10 percent by weight of the solution;
 - (c) an amine, at between about 10 to 80 percent by volume of the solution; and
 - (d) water.
2. The solution of claim 1 wherein the sulphur compound is selected from a group consisting of: hydrogen sulphide, methyl mercaptan, ethyl mercaptan, n-propyl mercaptan, iso-butyl mercaptan and carbonyl sulphide.
3. The solution of claim 2 wherein the sulphuric acid is in the form of a chelating agent.
4. The solution of claim 1 wherein the metal is selected from a group consisting of: copper, zinc, iron, magnesium or manganese.
5. The solution of claim 1 wherein the metal is copper.
6. The solution of claim 1 wherein the metal is zinc.
7. The solution of claim 1 wherein the amine is a primary amine.
8. The solution of claim 1 wherein the amine is selected from a group consisting of: monoethanolamine, diglycolamine, methyldiethanolamine.
9. The solution of claim 1 wherein the amine is a mixture of amines.
10. The solution of claim 1 wherein the sulphuric acid is present at between about 0.1 to 2 percent by volume of the solution.

11. The solution of claim 10 wherein the metal is present at between about 1 to 5 percent by weight of the solution.
12. The solution of claim 11 wherein the amine is present at between about 25 to 50 percent by volume of the solution.
13. The solution of claim 3 wherein the metal is selected from a group consisting of: copper, zinc, iron, magnesium or manganese.
14. The solution of claim 3 wherein the metal is copper.
15. The solution of claim 3 wherein the metal is zinc.
16. The solution of claim 3 wherein the amine is a primary amine.
17. The solution of claim 3 wherein the amine is selected from a group consisting of: monoethanolamine, diglycolamine, methyldiethanolamine.
18. The solution of claim 3 wherein the amine is a mixture of amines.
19. The solution of claim 3 wherein the sulphuric acid in the form of a chelating agent is present at between about 0.1 to 2 percent by volume of the solution.
20. The solution of claim 19 wherein the metal is at between about 1 to 5 percent by weight of the solution.
21. The solution of claim 20 wherein the amine is present at between about 25 to 50 percent by volume of the solution.
22. A solution for removing a sulphur compound or carbon dioxide from a fluid, said solution comprising:
 - (a) a metal/acid mixture at between about 25 to 75 percent by volume of the solution, said metal/acid mixture comprising:
 - (i) sulphuric acid in the form of a chelating agent at about 2 percent by volume,

- (ii) a metal, at between about 1 to 10 percent by weight, and
 - (iii) water; and
 - (b) an amine at between about 10 to 80 percent by volume of the solution, and
 - (c) water.
23. The solution of claim 22 wherein the sulphur compound is selected from a group consisting of: hydrogen sulphide, methyl mercaptan, ethyl mercaptan, n-propyl mercaptan, iso-butyl mercaptan and carbonyl sulphide.
24. The solution of claim 22 wherein the metal is selected from a group consisting of: copper, zinc, iron, magnesium or manganese.
25. The solution of claim 22 wherein the metal is copper.
26. The solution of claim 22 wherein the metal is zinc.
27. The solution of claim 22 wherein the amine is a primary amine.
28. The solution of claim 22 wherein the amine is selected from a group consisting of: monoethanolamine, diglycolamine, methyldiethanolamine.
29. The solution of claim 22 wherein the amine is a mixture of amines.
30. The solution of claim 22 wherein the metal/acid mixture is present at between about 25 to 50 percent by volume of the solution.
31. The solution of claim 30 wherein the metal is present at between about 5 to 10 percent by weight of the metal/acid mixture.
32. The solution of claim 31 wherein the amine is present at between about 25 to 50 percent by volume of the solution.
33. A solution for removing a sulphur compound or carbon dioxide from a fluid, said solution comprising:

- (a) a derivative of a sulphur-based acidic compound at between about 0.5 percent to 10 percent by volume of the solution,
 - (b) a metal, at between about 1 to 10 percent by weight of the solution,
 - (c) an amine at between about 10 to 80 percent by volume of the solution, and
 - (d) water.
34. The solution of claim 33 wherein the sulphur compound is selected from a group consisting of: hydrogen sulphide, methyl mercaptan, ethyl mercaptan, n-propyl mercaptan, iso-butyl mercaptan and carbonyl sulphide.
35. The solution of claim 33 wherein the metal is selected from a group consisting of: copper, zinc, iron, magnesium or manganese.
36. The solution of claim 33 wherein the metal is copper.
37. The solution of claim 33 wherein the metal is zinc.
38. The solution of claim 33 wherein the amine is a primary amine.
39. The solution of claim 33 wherein the amine is selected from a group consisting of: monoethanolamine, diglycolamine, methyldiethanolamine.
40. The solution of claim 33 wherein the amine is a mixture of amines.
41. The solution of claim 33 wherein the derivative of a sulphur-based acidic compound is at between about 1.25 to 3.75 percent by volume of the solution.
42. The solution of claim 41 wherein the metal is present at between about 1 to 5 percent by weight of the solution.
43. The solution of claim 42 wherein the amine is present at between about 25 to 50 percent by volume of the solution.
44. A solution for removing a sulphur compound from a fluid, said solution comprising:

- (a) a derivative of a sulphur-based acidic compound at between about 1.25 to 3.75 percent by volume of the solution;
 - (b) a metal, at between about 1 to 5 percent by weight of the solution,
 - (c) monoethanolamine at between about 25 to 50 percent by volume of the solution, and
 - (d) water.
45. The solution of claim 44 wherein the sulphur compound is selected from a group consisting of: hydrogen sulphide, methyl mercaptan, ethyl mercaptan, n-propyl mercaptan, iso-butyl mercaptan and carbonyl sulphide.
46. The solution of claim 45 wherein the metal is at about 2 to 4 percent by weight of the solution.
47. The solution of claim 46 wherein the metal is one of: (a) copper and (b) zinc.
48. The solution of claim 47 wherein the derivative of a sulphur-based acidic compound is at about 2.5 percent by volume.
49. The solution of claim 48 wherein the monoethanolamine is at about 25 percent by volume.
50. The solution of claim 48 wherein the monoethanolamine is at about 50 percent by volume.
51. A method of removing a sulphur compound or carbon dioxide from a fluid, comprising:
- (a) preparing a solution according to any one of the above claims, and
 - (b) contacting the fluid with the solution.
52. The method of claim 51 wherein the sulphur compound is selected from a group consisting of: hydrogen sulphide, methyl mercaptan, ethyl mercaptan, n-propyl mercaptan, iso-butyl mercaptan and carbonyl sulphide.

53. The method of claim 51 wherein the fluid is a gas.
54. The method of claim 51 wherein the fluid is a liquid.
55. The method of claim 53 wherein the gas is natural gas.
56. The method of claim 53 wherein the gas is air.
57. The method of claim 54 wherein the liquid comprises a liquid hydrocarbon.
58. The method of claim 54 wherein the liquid is drilling mud.
59. The method of claim 51 practiced at a temperature of between about 0°C and -51°C.
60. The method of claim 51 practiced at a temperature of between about -10°C and -40°C.
61. A method of removing a sulphur compound or carbon dioxide from a gas, which method comprises:
 - (a) preparing a solution according to any one of the above claims, and
 - (b) contacting the gas with the solution,and characterized in that the method is performed at a temperature of between about 0°C and -51°C.
62. The method of claim 61 performed at a temperature of between about -10°C and -40°C.
63. The method of claim 61 performed at a temperature of between about -20°C and -40°C.
64. The method of claim 61 performed at a temperature of between about -10°C and -30°C.
65. An acid/amine solution comprising:
 - (a) sulphuric acid, at between about 0.1 to 10 percent by volume of the solution;
 - (b) monoethanolamine, at between about 10 to 80 percent by volume of the solution;and

- (c) water.
- 66. The solution of claim 65 wherein the sulphuric acid is in the form of a chelating agent.
 - 67. The solution of claim 65 wherein the sulphuric acid is present at between about 0.1 to 2 percent by volume of the solution.
 - 68. The solution of claim 66 wherein the sulphuric acid in the form of a chelating agent is present at between about 0.1 to 2 percent by volume of the solution.
 - 69. An acid/amine solution comprising:
 - (a) a derivative of a sulphur-based acidic compound at between about 0.25 percent and 10 percent by volume of the solution, and
 - (b) monoethanolamine at between about 10 to 80 percent by volume of the solution, and
 - (c) water.
 - 70. The solution of claim 69 wherein the derivative of a sulphur-based acidic compound is at between about 1.25 and 7.5 percent by volume of the solution.
 - 71. The solution of claim 69 wherein the monoethanolamine is present at between about 25 to 50 percent by volume of the solution.
 - 72. A solution comprising the solution of claim 65, wherein the acid/amine solution of claim 65 is used as a source of monoethanolamine.
 - 73. A solution comprising the solution of claim 66, wherein the acid/amine solution of claim 66 is used as a source of monoethanolamine.
 - 74. A solution comprising the solution of claim 67, wherein the acid/amine solution of claim 67 is used as a source of monoethanolamine.
 - 75. A solution comprising the solution of claim 68, wherein the acid/amine solution of claim 68 is used as a source of monoethanolamine.

76. A solution comprising the solution of claim 69 wherein the acid/amine solution of claim 69 is used as a source of monoethanolamine.
77. A solution comprising the solution of claim 70 wherein the acid/amine solution of claim 70 is used as a source of monoethanolamine.
78. A solution comprising the solution of claim 71 wherein the acid/amine solution of claim 71 is used as a source of monoethanolamine.